CLAIMS

WHAT IS CLAIMED IS:

1. A package for a micro-electromechanical device (MEMS package), comprising:

an inner enclosure having an inner cavity defined therein; and

a fill port channel communicating with said inner cavity and of sufficient length to allow a quantity of adhesive to enter said fill port channel while preventing said adhesive from entering said inner cavity.

2. The MEMS package of claim 1, wherein said fill port channel extends at least partially into said inner enclosure.

3. The MEMS package of claim 2, further comprising a flow control structure extending at least partially into said inner enclosure and wherein said flow control structure prevents said adhesive from entering said cavity by physically separating said fill port channel from said inner cavity.

4. The MEMS package of claim 3, further comprising locking features formed on said flow control structure, wherein said locking features cause said fill port channel to have a variable cross section.

5. The MEMS package of claim 4, wherein said locking features comprise tapered sections formed on said flow control structure to form a choke point in said fill port channel.

6. The MEMS package of claim 4, wherein said locking features comprise stepped sections to form a choke point in said fill port channel.

7. The MEMS package of claim 3, wherein said flow control structure comprises a peninsula.

8. The MEMS package of claim 1, wherein said fill port channel is external to said inner enclosure.

9. The MEMS package of claim 8, further comprising a locking feature disposed within said fill port channel creating a variable cross section in said fill port channel.

10. The MEMS package of claim 9, wherein said locking feature comprises an island in said fill port channel.

11. The MEMS package of claim 9, wherein said locking feature comprises a plurality of islands in said fill port channel.

12. The MEMS package of claim 8, wherein said fill port channel follows a tortuous path.

13. The MEMS package of claim 12, wherein said tortuous path comprises a serpentine path.

14. The MEMS package of claim 1, wherein said fill port channel is external to said inner cavity and further comprising a plurality of locking feature groups disposed within said fill port channel, wherein said locking feature groups comprise varying sizes of locking features configured to prevent contaminants from reaching said inner cavity.

15. The MEMS package of claim 14, wherein locking feature groups comprise a first locking feature group having locking features of a first size, a second feature group having locking features of a second size being smaller than said first size, and a third locking feature group having a locking features of a third size being smaller than said second size.

16. The MEMS package of claim 15, wherein said locking features comprise island locking features.

17. A package for a micro-electromechanical device (MEMS device), comprising:

an inner enclosure having an inner cavity defined therein;

a fill port; and

a fill port channel coupling said inner cavity to said fill port wherein said fill port channel is external to said inner enclosure and is of a sufficient length to allow a variable flow of adhesive to enter said fill port while preventing said adhesive from entering said inner cavity.

18. The MEMS package of claim 17, further comprising an island locking feature disposed in said fill port channel near said fill port.

19. The MEMS package of claim 17, wherein said fill port channel follows a tortuous path between said fill port and said inner cavity.

20. The MEMS package of claim 19, wherein said tortuous path comprises a serpentine path.

21. The MEMS package of claim 17, and further comprising a plurality of locking feature groups disposed within said fill port channel, wherein said locking feature groups comprise varying sizes of locking features configured to prevent contaminants from reaching said inner cavity.

22. The MEMS package of claim 21, wherein locking feature groups comprise a first locking feature group having locking features of a first size, a second feature group having locking features of a second size being smaller than said first size, and a third locking feature group having a locking features of a third size being smaller than said second size.

23. The MEMS package of claim 22, wherein said locking features comprise island locking features.

24. A package for a micro-electromechanical device (MEMS device), comprising:

an inner enclosure having an inner cavity defined therein;

a fill port channel coupling said inner cavity to an atmosphere; and

flow control structure extending at least partially into said inner enclosure and being configured to control the flow of fluid into said inner cavity.

25. The MEMS package of claim 24, wherein said flow control structure comprises a physical barrier between said fill port channel and a portion of said inner cavity.

26. The MEMS package of claim 25, wherein said physical barrier comprises a peninsula.

27. The MEMS package of claim 24, further comprising locking features formed on said flow control structure.

28. The MEMS package of claim 27, wherein said locking features comprise tapered sections formed on said flow control structure.

29. The MEMS package of claim 28, wherein said tapered sections form a choke point at an intermediate portion of said fill port channel.

30. The MEMS package of claim 27, wherein said locking features comprise a plurality of stepped portions.

31. The MEMS package of claim 30, wherein said stepped portions form a choke point at an intermediate portion of said fill port channel.

32. A micro-electromechanical (MEMS) assembly, comprising:

a MEMS device disposed at least partially within a package,

wherein said package includes an inner enclosure having an inner cavity defined therein, and a fill port channel coupling said inner cavity to an atmosphere and physically separating said atmosphere and said inner cavity by a distance sufficient to allow a variable flow of adhesive to enter said fill port channel while preventing said adhesive from entering said inner cavity; and

an adhesive seal coupled to said fill port channel.

33. The assembly of claim 32, further comprising a fluid contained within said inner cavity.

34. The assembly of claim 32, wherein said fluid comprises a degassed packaging fluid.

35. The assembly of claim 32, wherein said adhesive is physically separated from said MEMS device by said flow control structure.

36. The assembly of claim 32, and further comprising locking features formed in said fill port channel and wherein said adhesive seal is locked in said fill port channel by said locking features.

37. The assembly of claim 32, wherein said adhesive seal comprises a photo resist material.

38. The assembly of claim 32; wherein said adhesive seal comprises a solder material.

39. The assembly of claim 32, wherein said adhesive comprises a thermo-set material.

40. The assembly of claim 32, wherein said adhesive comprises UV curable epoxy.

41. The assembly of claim 32, wherein said adhesive comprises thermoset epoxy.

42. The assembly of claim 32, wherein said adhesive comprises moisture/fluid cure adhesive.

43. A method of forming a package for a micro-electromechanical device (MEMS device), comprising:

forming an inner enclosure having an inner cavity defined therein and

forming a fill port channel, wherein said fill port channel is in fluid communication with an atmosphere and said inner cavity is of sufficient length to allow a variable flow of adhesive to enter said fill port channel while preventing said adhesive from entering said inner cavity.

44. The method of claim 43, wherein said fill port channel extends at least partially into said inner enclosure and further comprising forming a flow control structure to form said fill port channel and to physically separate said fill port channel from said inner cavity.

45. The method of claim 44, wherein said flow control structure further comprises locking features formed thereon.

46. The method of claim 45, wherein said locking features form at least one choke point at an intermediate portion of said fill port channel.

47. The method of claim 45, wherein said locking features comprise a plurality of tapered sections which form a choke point at an intermediate portion of said fill port channel.

48. The method of claim 45, wherein said locking features comprise a plurality of stepped sections that form a choke point at an intermediate portion of said fill port channel.

49. The method of claim 44, wherein said fill port channel is external to said inner enclosure and further comprising forming an island flow control structure within said fill port channel.

50. The method of claim 44, wherein said fill port channel follows a curvaceous path.

51. A method of sealing a micro-electromechanical package, comprising:

filling a MEMS package with a fluid whereby said MEMS package and said fluid are at a first temperature;

placing an adhesive in intimate contact with said fluid; and

lowering said MEMS package to a second temperature, wherein said second temperature is lower than said first temperature to change a relative volume of said fluid and thereby draw said adhesive at least partially into said MEMS package.

52. The method of claim 51, wherein said first temperature is 75 degrees Celsius and said second temperature is 60 degrees Celsius.

53. The method of claim 51, further comprising curing said adhesive.

54. A MEMS package, comprising:

means for containing a MEMS device;

means for introducing a fluid to said means for containing said MEMS device; and

means for separating a portion of said means for containing said MEMS device from said means for introducing said fluid.

55. The package of claim 54, further comprising means for locking an adhesive within said means for introducing said fluid.

56. The package of claim 55, wherein said means for locking said adhesive includes means for filtering said fluid.